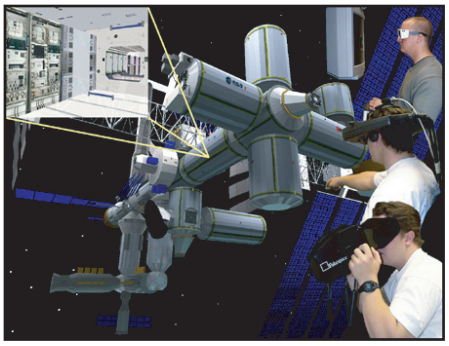
Human Factors

research and technology division

Space Perception in Virtual Environments

Objective

To assess the acquisition of spatial knowledge gained while exploring virtual environments with qualitatively distinct interface designs. Understanding the unique contributions afforded across different interfaces allows for the development of appropriate design specifications for a myriad of potential control, simulation, and training applications. We intend to develop a predictive model of what types of visualization tasks would benefit from higher degrees of interface fidelity, and thus merit the added expense and difficulty of implementation.



Approach

This research investigates the effects of interface fidelity on navigation and search efficiency, spatial orientation, and remembered environment configurations. Interface fidelity is characterized as the extent to which motor and vestibular sensory information is concomitant with sensory visual information. The speed, accuracy, and consistency of observers performance across variable levels of fidelity suggests its significance for performing in a given task domain.

Impact

The National Academy of Science's report on VR recommends investigations to determine when a particular display platform would be advantageous for a specific visualization task. Our research suggests that superior orientation is mediated by higher degrees of interface fidelity. Further, interfaces characterized as having a low interface fidelity promote unnatural search strategies that often sacrifice performance on one task (e.g., search) for a gain in performance on another (e.g., perceived orientation).

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